Gas Journal

VOL. 301 112th YEAR LONDON, FEBRUARY 17, 1960 No. 5033 PRICE 1/6

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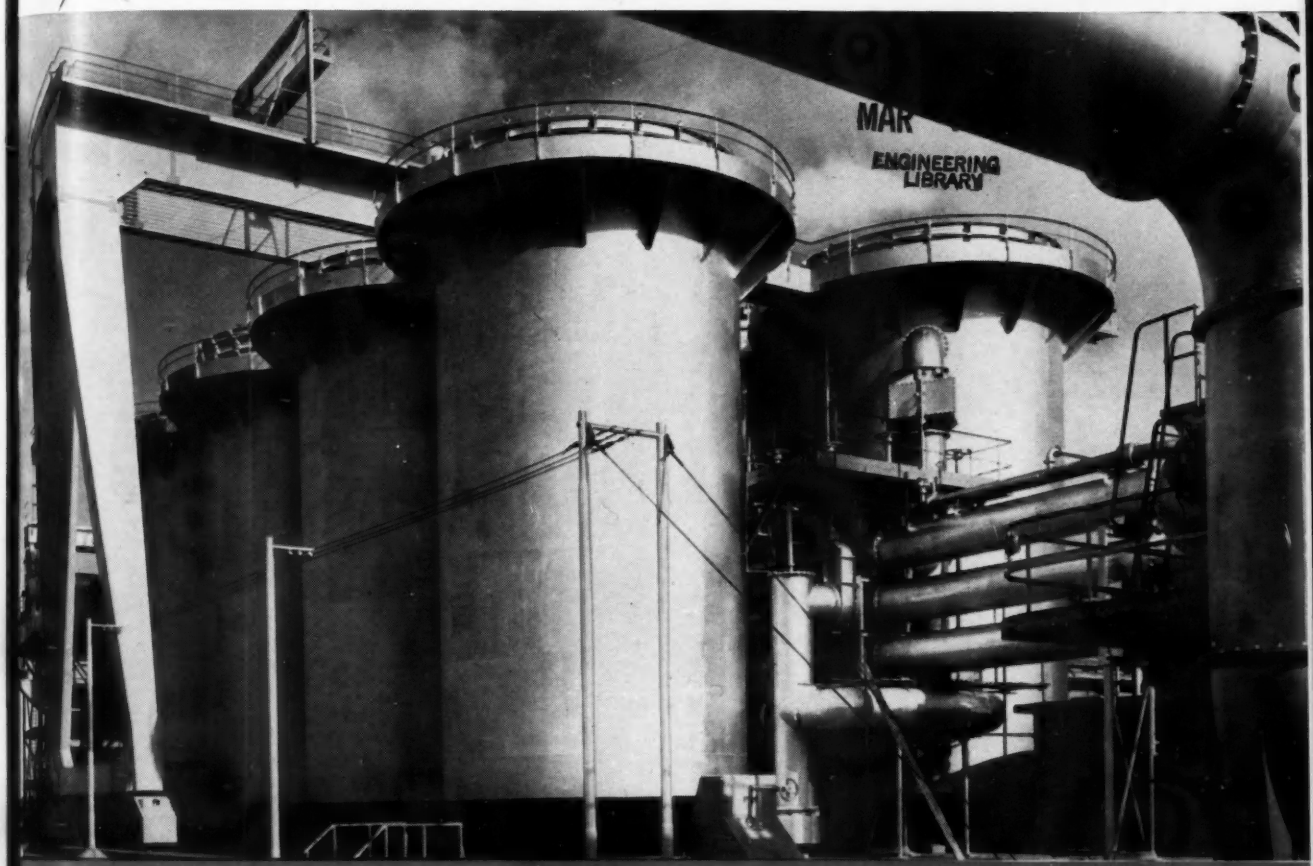

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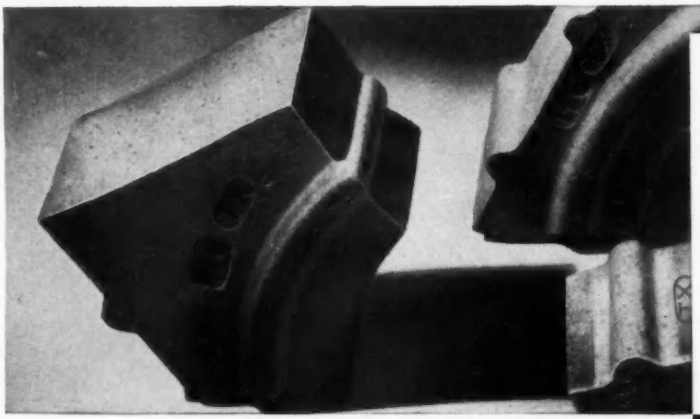

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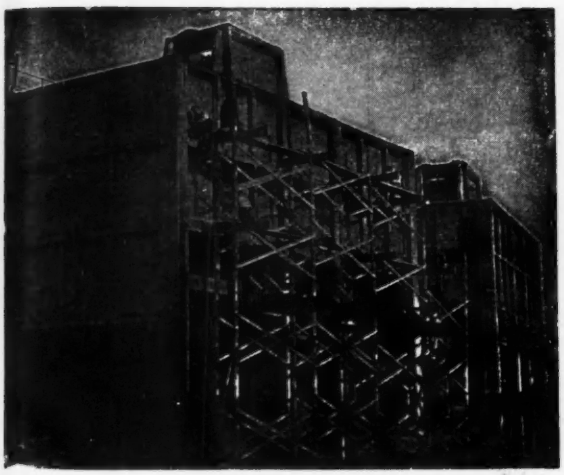

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Gas Journal

VOLUME 301 • NUMBER 5033 • 112TH YEAR

WEDNESDAY, FEBRUARY 17, 1960

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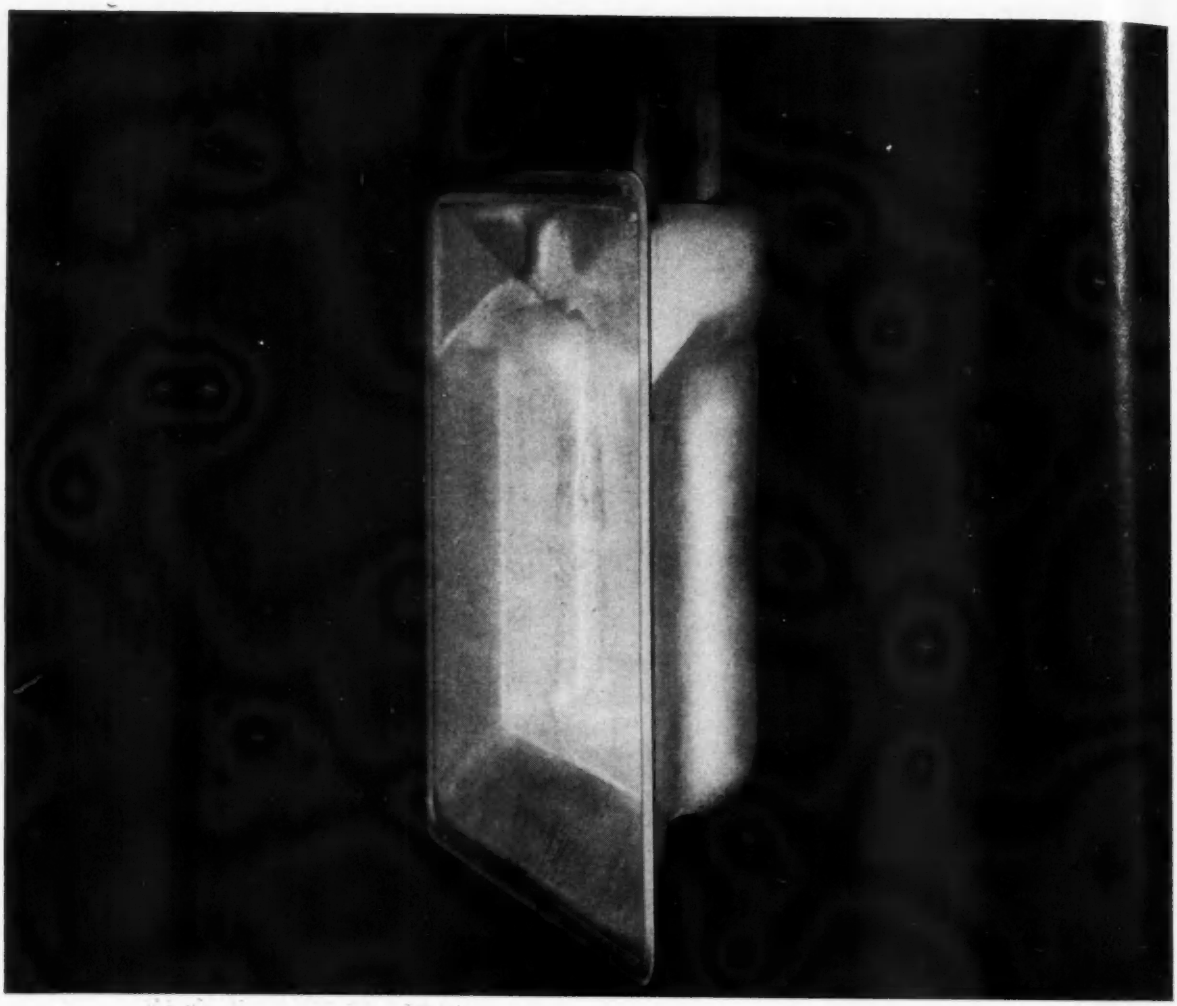
PUBLISHERS' NOTICE, SEE PAGE 251, FEBRUARY 10, 1960



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Functionalism and customer service

WHEN the history of the nationalised gas industry comes to be written a special chapter must be reserved for the Southern Gas Board which has probably undergone a metamorphosis more complete and in a shorter space of time than any other area. The reason is that one tends to calculate the speed of progress not from 1949 but from 1956, the period which might now be appropriately referred to as four years A.L. (After Leach). Certainly the appointment of Mr. C. H. Leach had a profound effect on the fortunes of the Board. Presented with the formidable challenge of a scattered, thinly populated area with four or five sizeable, but awkwardly placed, undertakings, the new Chairman set out to prove that most of the principles he had adopted in Liverpool could be applied to this rambling territory. That he met the challenge with both imagination and determination is apparent to anyone who has visited the area during his period of office, and the success which has attended his efforts is perhaps most noticeable on the consumer service front. This was described by Mr. D. M. Foulis in a paper to the London Juniors last month which we publish, together with a report of the discussion, in this issue.

The author, who is Administrative Assistant to the Commercial Manager, was a member of the talented caravan of people who followed Mr. Leach south, and his paper consists of a factual description of the reorganisation of customer—he dislikes the term 'consumer'—service in his area. It makes interesting reading, not only because of the ideas incorporated but because one is conscious all the time of the upheaval which must have attended the introduction of these practices. We have Mr. Foulis's word for it that 'the dust has now settled,' but he leaves one in no doubt concerning the endless search for ways of improving the machinery still further.

Certain aspects of the paper are worthy of particular mention. For example, the intriguing but all too brief reference to freeing the salesman for selling activities. 'One object of the customer service department,' says Mr. Foulis, 'is to leave the salesman free to spend his time selling. He is not expected to write out job tickets, arrange deliveries, answer routine telephone calls, and so on. These jobs are done by others trained in that work.' We have long advocated the recognition of selling as a specialist activity, and anything contributing towards that ideal must be regarded as worthwhile, but it would be interesting to know by how much the income from additional sales exceed the clerical costs. Moreover, it is difficult to imagine all the salesmen selling all the time; slack periods in the showrooms often enable sales staff to catch up with their paperwork.

Another passage which might usefully have been expanded is that referring to the fact that no records of customers' accounts, meters or appliances are kept in the regions. The author admits that, 'deprived of this information, the sales staff had difficulty at first in handling accounts queries,' but claims that 'training in the new and simpler techniques has greatly reduced this problem'; so evidently it still exists.

A couple of weeks ago we discussed a technique developed by the Northern Gas Board for speeding up cooker installation. Evidently the Southern Board is equally alive to the need for speedy fixing for Mr. Foulis reports that a job not carried out on the first day after delivery automatically assumes the priority of a 'promised' job; if the latter cannot be done on the day 'the customer is notified promptly.' How? By telephone? And if the customer is not on the 'phone?

Speaking of the telephone, it must be conceded that it is in the skilful utilisation of this friend of man(?) that Mr. Leach has made one of his major contributions to the industry. The description of the telephonic set-up strikes us as being particularly interesting. We have some small experience of telephoning gas boards and have on many occasions been irritated and inconvenienced by the apparent lack of system resulting in delays and, not infrequently, in having to telephone an entirely different number because the telephone directory entry was misleading. Clearly a good deal of thought has been given to this important matter in the Southern area, and our personal experience of the result is gratifying. We sometimes wonder whether gas

boards in general give enough thought to making the means of contact between themselves and their customers as simple and pleasant as possible. How many sales are lost because the potential customer has to make fractionally more effort than he is prepared to?

There are a number of other subjects covered by Mr. Foulis—such as the impossibility of free service and the reduction in estimating—which deserve comment but which demands on space preclude. However, the paper (necessarily shorn of its appendices) appears on a later page and may be studied by those interested. We hope the readership will be a wide one because although on the face of it this is a specialist paper concerning customer service, it is also the reflection of a certain attitude of mind and an approach to a problem which is both imaginative and progressive. This is not a case of 'Functionalism rides again' because it never dismounted!

The background to instrumentation

INSTRUMENTATION as an integral part of automation in the chemical processing industries is developing fast. Gas manufacture may also be included in the industries grouped under this heading, so any new developments are of interest to our industry too.

The decision to use liquid feedstocks either in place of or to supplement coal as the raw material for gas production has had a particularly galvanising effect on the trend of advanced instrumentation in gas production and brings it into line with the conception now accepted by the distribution side of the industry.

The very use of oil itself will have had its effect, since most of the plants in which oil undergoes heat treatment in the refinery are highly instrumented and are controlled either automatically or centrally by the plant attendant.

The oil-gas production plants most common in this country at the present time depend on some cyclic operation, and so the mechanical operators which have been developed for water gas production, can be adapted for oil gas plants; their working will therefore be familiar to gas engineers.

For the smaller peak load plants attached to conventional gasworks and only working for short periods at certain seasons of the year, the extent of instrumentation need only be on a limited scale, but for large base load plants it can profitably be greatly extended. The degree of instrumentation and centralised control on one such plant—the Segas oil gasification plant at the South Eastern Board's Isle of Grain gasworks—which has a present capacity of some 20 mill. cu.ft. per day, is unique in this country. Although we have described this plant in some detail in an article published last year, the extent of its instrumentation and its effect on the type of manpower employed were but briefly referred to.

Modern instrumentation on the scale installed at the Isle of Grain is not only extremely expensive, but to be worth using, it must be carefully designed and perfectly accurate in the information it brings to the central control panel for the operators' use. Without this latter stipulation, not only are inaccurate conclusions drawn as to the economic running of the plant, but the confidence of the operators in its use will also be shaken; any belief in the advantages to be gained in cutting down manpower and hourly calculations of efficiency, etc., will cease to have any significance.

In a paper which Mr. T. A. Lucas, of the South Eastern Gas Board, read to the Society of Instrument Technology last week on 'Measurement, automatic control and data reduction as applied to a cyclic plant,' are set out some of the details of the planning behind the instrumentation and control on such an elaborate scale as at the Isle of Grain gasworks.

This paper, we think, ought to be read with another by Mr. J. E. Davis, Chief Technical Officer of the Board in collaboration with Mr. Lucas, given before the International Gas Union at Rome in 1958. Whereas Mr. Lucas' present paper deals almost exclusively with the placing of the points at which measurements are to be made and the many considerations which must be taken into account to guarantee the accuracy of any such measurements, the joint paper in its introduction assesses the effect on the operators of varying degrees of instrumentation. In this way it discusses the whole background against which all instrumentation and automation should be viewed. These latter points, we think, are almost as important as the choice and placing of the instruments themselves.

It is clear that although the number of plant attendants may be cut down considerably by the proper use of centralised control, there is a minimum of attendance necessary which as yet is at least one man per shift. Too much automatic control will not give this man enough to do and too little will cause him such hard work that he may be physically unable to carry out his duties. In the first case he will get bored, lose interest and probably doze off on the night shift, and in the second case his health may suffer or he will look for an easier job. A nice balance must be struck which not only prevents him getting bored but stimulates the sense of power put into his hands by this up-to-date equipment. The training and standard of intelligence of the operators is most important and the Board, recognising this, are most careful to see that only suitable men who have passed through the British Petroleum Company's training school are in fact employed as operators in their Isle of Grain control room.

Going back to the present paper, we are most impressed by Mr. Lucas' description of the detail which has been necessary to make quite certain that the quantities measured by the instruments in the central control room do indeed represent the accuracy of which the instruments are capable. The measurement of temperature in the reaction vessels needed the most careful placing of the thermocouple elements to prevent possible damage by shifting catalyst. The sampling of the

make gases for carbon dioxide content determinations and for the measurement of calorific value was most ingenious, especially since the two pairs of Segas plants are synchronised to give as far as possible a continuous make of gas, but the alternative gas streams must each be sampled without mixing during a period of a few minutes. Such ingenuity appears to be a commonplace among designers of modern applications of accurate instrumentation to plants of all types; it is of course the placing of the measuring point, the accuracy with which the sample is taken, and the speed and accuracy of the telemetering system combined with the means of remote control that make or mar the whole layout.

We feel that Mr. Lucas, who is the Board's instrument engineer, has shown considerable ability in writing this paper, because although he is speaking essentially to instrument technologists, his subject matter is completely intelligible to gas engineers.

With the change in processes employed for gas making, whether from coal or oil, the tendency is for greater and greater outputs to be obtained from plants of smaller physical dimensions. This in turn involves progressively tighter control on the conditions under which the plant operates to avoid large volumes of gas unsuitable for distribution. This can only mean more instrumentation and a more accurate minute to minute indication of what the plant is doing.

Mr. Lucas has given us a glimpse behind the scenes and shown us some of the problems that have to be solved. We have found it of the greatest interest.

Mr. Lucas' paper is the copyright of the Society of Instrument Technology and will be published in full, together with the discussion, in the Transactions of the Society. We are obliged to the Society for enabling us to refer to the paper.

Commentary on the News

The smothered question

LAST Wednesday the Tyne Tees Television Network produced for Channel 9 viewers, a feature designed to discover what part coal gas, electricity, oil, atomic energy and other sources of power will play in the future. To solve the problem the organisers laid on an all-star cast headed by the Minister of Fuel, Mr. Richard Wood, and leading figures from the N.C.B., N.U.M., F.B.I., B.P., and similar cryptically labelled bodies.

If the ordinary viewer was puzzled before by the fuel situation his condition after this confused half hour must have beggared description. There were references to the development of premium fuels, the closing of pits, the investment in refineries, oil-slanted gas research, and various other well-chewed items, but nothing was resolved, nothing fell into a pattern, nothing really made sense. As an example of bad planning, inadequate investigation, sloppy briefing and inept chairmanship, the programme could hardly be beaten. Our sympathies lay with all the guest participants and most of all with the Minister who manfully ploughed through the morass of unfinished arguments with a sort of dogged despair. He would like, he said, to see the price of fuel and power as cheap and competitive as possible because only then could industry continue to compete; and he would like to see more research done on the development of gas, coal and electricity. Wouldn't we all?

None of the industries represented could have been pleased by the programme, but for the gas industry there was one particular irritation. Two housewives were interviewed, one in a modern kitchen with an up-to-date electric cooker, the other in an old-fashioned kitchen with an old-style gas cooker. However, when both ladies were asked whether, if fuel became cheaper, they would use more, both said they would, and the gas consumer—bless her!—muttered something about having more gas fires.

'The Burning Question' was a damp squib.

Familiar ring

THE bells have been tolling for gas for a long time now, so long in fact that the clamour might almost be mistaken for a victory peal.

Last week we reported Bailie J. Reynolds, of Greenock, as saying that the gas industry was dying and in from ten to 15 years' time would be as extinct as the dodo.

This week we are indebted to Mr. Noel S. Smith for a cutting from the *Greenock Telegraph* of November 26, 1923, in which a certain Bailie Brown is quoted as saying that 20 years hence there would be no gas required.

Gas at work in industry

THE Gas at Work in Industry Exhibition which, as we announced recently, will open at the Royal Horticultural Hall, London, on March 1, promises to be no less interesting and successful than its predecessor three years ago. Indeed, preliminary details suggest that this year's exhibition will make the association of gas with modern forms of technical development and manufacture even more apparent. Atomic energy, radar, electronics, aircraft, space travel—all are represented.

The exhibition is being divided to show as main features heating liquids, heat treatment, glass working, automatic glass fabrication, flame heat treatment, high temperature radiant heating and gas burners, metal melting, low temperature radiant and convection heating, baking, etc.

Two processes using hot water will demonstrate the cooking of hams, and the preparation for the cleaning and stripping of chickens. Two furnaces will demonstrate clean heat treatment—a shaker-hearth furnace for case-hardening or surface carbon correction and the other a rotary retort furnace treating small parts and utilising a simplified version of atmosphere gas producer; a conventional belt conveyor furnace with cooling section for bright annealing and brazing will also be in operation.

An entirely new technique—the vitreous enamelling of aluminium—will be demonstrated, and in this case the furnace will be heated by radiant tubes, a development which is already firmly established for the higher temperature processes of clean heat treatment. Another interesting technique is the manufacture of electric lamps and radio valves, and machines will be shown which will give some idea of the high degree of automatic control employed in operating using precision gas flames.

These and many other processes, including badge enamelling and baking, should show gas as the flexible, adaptable fuel we know it to be.

GAS JOURNAL February 17, 1960

From a paper to the London and Southern Junior Gas Association, London, January 8, 1960.

Re-organisation of customer service in the Southern Gas Board

By D. M. FOULIS, Assoc.Inst.Gas E., A.I.I.A.,

ADMINISTRATIVE ASSISTANT TO THE COMMERCIAL MANAGER, SOUTHERN GAS BOARD.

CUSTOMER service can be regarded as having two main aspects. The first is to get the right man on to the job quickly and efficiently. The second is to see that his technical work is of a high standard and done in good time.

It may be helpful to quote some Board statistics. About 625,000 customers are scattered over some 5,700 sq. miles of Dorset, Hampshire, the Isle of Wight and eight other counties. Much of the area is rural; there are no large centres of population and little heavy industry. The number of customers per mile of main is the lowest in any Board. These factors increase the need for mobility, flexibility and good communications and so tend to put up the cost of service.

At vesting date, 63 separate undertakings became the Southern Gas Board. The area was divided into four divisions, each under the control of a General Manager with direct responsibility for all divisional affairs. Area headquarters acted mainly as a holding company. Divisions were sub-divided into two, three or four groups, each with a group general manager responsible to the Divisional General Manager for all functions. Groups were responsible for every aspect of customer service including stores, transport and financial and customer accounting. Their numbers of customers ranged from 12,000 to 145,000.

Variations in areas

Commercial practice in a group was generally that which had obtained in the largest member undertaking prior to vesting date. Sales and service were usually controlled from small district offices with their own stores. Installation methods and emergency services varied widely and about ten different sets of documents were in use. One large unit had no outside salesmen, another gave generous district coverage. Appliances were bought and sold at varying prices throughout the area. Work done free in one unit was charged for in another. In one group, complaints were dealt with promptly; in others there were often delays of three to four weeks.

In 1956, senior officers were appointed to take charge of production, distribution, accountancy, commercial and other specialist functions. Concurrently with the commercial re-organisation, financial and customer accounting, costing and wage payment were concentrated in one central office in Southampton under the control of the Chief Accountant—a major operation which took 18 months to complete.

The purchasing of all goods other than raw materials became the responsibility of the Purchasing Officer at headquarters. Regional stores controllers are now directly responsible to him, but maintain close liaison with heads of user departments. Appliances and materials are ordered in bulk centrally and regional requirements 'called off' weekly. Regions may order special items such as cooker parts directly, but almost all invoices are checked centrally.

Appliance despatch and collection is controlled by regional transport officers responsible to the Board's Transport Manager. Publicity and display are also controlled centrally.

The Board now has a training centre at Bournemouth under the Training and Education Officer. In the last two years more than 1,000 employees of all ranks have taken courses there. Supervisors from all departments have taken an initial management training course.

The Commercial Department may also call on other specialist services, for example those of the Market and Operational Research Manager, the Personnel Manager and the Solicitor.

Board's 'family tree'

The Commercial Manager is directly responsible to the Board for all commercial activities. His headquarters staff includes an Assistant Commercial Manager, Industrial Gas Officer, Administrative Assistant, Technical Assistant, one clerk and a few typists. There is also the Publicity Manager and his department.

The Board's area is divided into five regions, the largest being Wight and Portsmouth with 177,000 customers and the smallest Oxford with 79,000. Five regional Sales and Service Managers are directly responsible to the Board's Commercial Manager for all commercial activities including customer service.

Selling and fittings organisations must always remain close to the customer. In choosing the right degree of decentralisation one has to weigh the economies of large unit working against the extra cost and difficulty of communication. A typical problem, for example, is whether district salesmen should operate from the central showroom in a town or from branch showrooms. And again should the fitters work from a central depôt or from several small depôts? In the author's experience, the answer is almost always a greater degree of centralisation than before.

Standard documents and routines are essential in a large organisation, particularly one with central customer accounting. Most documents in the Southern Gas Board are of standard size and special attention is paid to lay-out and colour. Different six-figure number series identify different categories of work. These features simplify sorting, handling and filing.

Senior officers from the functional departments work closely with the organisation and methods department in designing standard documents and routines. Draft schemes are prepared at headquarters and circulated for comment by the departments concerned. Amendments are con-

sidered and decisions then made by the functional heads or senior members of their staff.

One object of the customer service department is to leave the salesman free to spend his time selling. He is not expected to write out job tickets, arrange deliveries, answer routine telephone calls and so on. These jobs are done by others trained in that work. Selling has thus become a specialist activity. All members of the sales staff have attended a week's residential course at the training centre, and refresher courses will start in the near future. Many small uneconomic showrooms have been closed and greater use is made of mobile showrooms. Canvassing dealers are having striking success in setting the pace for our own salesmen.

One of the major problems of customer service is telephony. A wide range of calls has to be dealt with every day and a round-the-clock service given throughout the area.

Service by telephone

In each region a telephone enquiry bureau deals with all customer calls. Its receptionists are specially trained to handle every type of enquiry. They do not, of course, always know the answer themselves, but they do know how to deal with each call efficiently. Customers are encouraged to telephone the bureau direct, instead of contacting individual showrooms or departments via the switchboard. Directory entries are set out with this in mind. For example, the entry in the Portsmouth directory reads: '*All troubles and repair calls, enquiries and orders—Portsmouth 22271.*' Then follows a list of the various showrooms and their telephone numbers. The number of the regional office is also included, but in smaller type.

Four regions are equipped with a No. 3 private automatic branch exchange, which provides for the direct dialling of extension numbers. As calls from customers have been diverted elsewhere, only one operator is needed to handle the switchboard. The installation usually has ten exchange lines and about 80 extensions.

Each telephone enquiry bureau has banks of order boards with lamp and key equipment. Each incoming call to these 'junior switchboards' is indicated by a red light which, on acceptance, is replaced by green. This visual signalling is invaluable in cutting out the noise of ringing bells.

Each board usually takes the first four and three others of ten exchange lines. Twelve of the remaining 13 positions are linked direct to large showrooms, the main switchboard and the records section in the customer service department. One line is always connected to a supervisor's panel which can thus take or monitor any call. This bureau is the focal point for *all* customers' calls. Rarely has a customer to tell her story more than once.

Calls out of normal hours are diverted to a night extension switchboard, except in a few remote areas where they are routed to the homes of duty supervisors or fitters. The total number of night control points has been reduced from 50 to eleven and will soon be even less.

Most of the clerical activities in a region are handled by the customer service department. Its chief function is to plan and control emergency, maintenance and installation work on the district. When a customer requires a visit from a fitter, maintenance man, salesman, meter reader or slot collector she is normally told the day on which he will call. In some regions unsuccessful calls have been cut by half in this way.

Schedule dates for all classes of district work are known to every sales unit and telephone enquiries bureau. The work control section tells them of any day-to-day deviations. This principle of dealing only with the exceptions is adopted whenever possible in the service organisation.

Customers reporting complaints in a showroom or by telephone are told when a visit will be made. It will normally be the following day and never later than 'D + 3.' No records are kept of such day-to-day transactions, for this would take about 15 more clerks. But accurate work planning is essential and maintenance supervisors *must* make sure that work is done on the day promised. The efficient control of 'spot' maintenance and the replacement of parts is the key factor in the organisation of district work.

It is difficult to define the optimum size of a control unit. Within the range possible in the Southern Gas Board however, the larger the unit the less costly it is per thousand customers and the easier it is to run efficiently.

In 1958, the area of local telephone calls was extended and we were thus able to close many small sub-units. For example, small offices at Fareham, Gosport, Havant, Petersfield, Chichester and Bognor were all closed and their districts served directly from Portsmouth. 'Out of area' exchange lines link to the regional office those districts still outside the range of a local call. Customers in Salisbury, for example, still telephone their local number. Their calls are automatically put through to Southampton, 25 miles away.

The despatch desk of the work control section is responsible for the planning and issue of all maintenance and emergency work. Here the hand-completed standard forms arrive from the telephone enquiry bureau by conveyor belt and from various other sources. Fitters, maintenance men and special slot collectors telephone the desk at pre-arranged times for urgent work. Distribution emergency teams and some emergency fitters use radio telephone equipment for the same purpose. Calls can be relayed to the distribution department if necessary.

A bank of non-directory numbers is allocated to this unit to by-pass the switchboard. As in the telephone enquiry bureau, order boards are standard equipment and a revolving turntable helps the clerk to handle calls without moving from his desk.

Maintenance and installation

In planning maintenance work, fifteen half-hour units are allocated to each man in the maintenance team. No special vouchers are issued for this type of work. The fitter's job ticket is the hand-written report form on which the original complaint was recorded. Contract maintenance cards, however, are issued in weekly batches, the file of signed contracts providing the office record.

Installation work is planned in the same section. When orders have been checked and job vouchers raised, the labour factor is recorded against the depôt and day the work is to be done. A productive day of 7½ man-hours is used for planning purposes. This work is greatly simplified if the labour force can be increased at short notice by the employment of contractors. Many depôts have only a handful of fitters. If one or two are needed for a large commercial job, service will suffer unless work can be contracted out.

Job vouchers are prepared by copy typists. Each set contains the following four copies:

No. 1—The fitter's job ticket, subsequently the medium for debiting the customer or adjusting the accounting record.

No. 2—One half, an office record of work issued to depôts; the other a record for use at depôts. Either can

be used as a 'chaser' slip.

No. 3—A stores requisition for appliances, parts, meters, standard kits and a few fittings.

No. 4—An office copy for record purposes.

If more than a few fittings are required, two copies of a supplementary requisition are attached. These have been made out previously by the salesman or surveyor. Normally the planned or promised date is typed on the documents. Necessary exceptions, however, include jobs awaiting instructions, appliances not in stock, carcassing work and various minor jobs. Distribution job vouchers and Street Works Act notices are also issued.

If delivery is involved, a transport set containing three more copies is typed simultaneosuly with the voucher set. The first is the transport office record and the second the driver's instruction sheet. The third is a label to be attached to the appliance, meter or bag of materials. No transport set is necessary, of course, for the many small parts sent by post.

Office filing systems

Vouchers are checked, split and sent off immediately after typing. Delivery schedules may be from daily up to weekly according to district demand. Normally two days notice is required. The bulk of Wednesday's load, for example, is passed to stores by 5.0 p.m. on Monday. On Tuesday, the appliances and materials are made up on the bay for loading on Wednesday morning. Where facilities are inadequate and cannot be improved, some vehicles may be loaded in the late afternoon.

Meanwhile, fitters' job tickets, chaser slips and copy requisitions are passed to the allocation desk. Here the papers are sorted for issue to fitters' depôts. The desk adapted for this work has receessed portions adjustable for variations in the work load. Work is thence despatched each afternoon by messenger or by post to depôts or to fitters at their homes.

Enquiries about work in progress are handled by the records section. The records are simple, and three in number. The first is a visual strip index of the Kardex type. Cards for every street and road are filed in alphabetical order in cabinets containing eight or 12 trays. Maintenance work excepted, all jobs are recorded from the office copies by entering the customer's name, house name or number and the job voucher number.

The second record is the office copy itself filed in a binder in serial number order. Sales analyses records, claims for commission and so on are taken from here. The third record is the chaser slip filed against the depôt and date of despatch.

Normally the clerk refers to the Kardex for the job number and then finds the office copy. He does not usually have to resort to the file of chaser slips. The records section also handles queries received by post and chases uncompleted jobs. Its final work is to mark off completed jobs for filing or despatch to the central customer accounting department. Ultimately it has to account for every voucher issued.

It is important to answer enquiries promptly but far better to avoid them altogether. The percentage of enquiries about jobs in progress is, in fact, a useful index of the efficiency—or rather the inefficiency—of a service department.

A small sub-section is responsible for the preparation of estimates. The wide use of standard charges has greatly reduced this work and only one chargeable job in a hundred now needs an individual estimate. Charges for industrial, commercial and special domestic installation work, however, cannot be standardised.

Salesmen, surveyors and supervisors submit details of the work on a 'request for estimate' form, made out in triplicate. The materials needed are listed on the back of the form. One copy is used for pricing and the second as a stores requisition. The third copy advises the fitter of the materials he can expect to find on the premises. There is thus no need for retyping long lists of materials on to a voucher.

No records of customers' accounts, meter or appliances are kept in regions. Deprived of this information, the sales staff had difficulty at first in handling accounts queries, but training in the new and simpler techniques has greatly reduced this problem.

The district organisation is linked closely to the customer service department. In large units, the fitters are grouped into emergency, maintenance or installation teams. Supervisors are similarly specialised, or may even concentrate on new property or contractors' work. In smaller units, however, emergency and maintenance may be combined. In rural areas no specialisation is attempted, but priority is given to emergency and maintenance work.

A fitter's depôt not attached to a main stores has a small imprest stock of meters and materials. No storeman is employed and the stock is controlled by a supervisor. In the larger units, a few fitters concentrate on exchanging meters. They drive 10 cwt. vans with an imprest stock of 15 to 20 meters.

Time sheets have been replaced by time record cards which can, if required, be used with a standard time clock. Fitters record shop time, starting time, finishing time and the voucher number of each job visited. Cards are forwarded each Monday to the central wages department. Stand-by or call-out work is recorded on a supplementary card. Many fitters start and/or finish work on the district. All district staff except a few emergency shift fitters work a five-day week.

Apart from the first 15 minutes spent on escapes, all labour expended on the maintenance of customer appliances is charged for, and fitters are encouraged to collect cash on $2\frac{1}{2}\%$ commission.

'Free' service tradition

It has become clear that we can no longer afford to do work for nothing, but the old tradition of 'free' service dies hard with our customers—and even more so with some of our employees. It is expected that a charge will be made for service to the television set. It will gradually be accepted that this also applies to the gas cooker.

Escapes and no-gas jobs are dealt with by a special force of emergency fitters whose main object is to give a quick first-aid service. They also deal with complaints in appliances and supplies essential to the running of a home or business.

Most of these men drive 5-cwt. vans, some equipped with radio telephone. These vans contain meters, short lengths of pipe and fittings. Work is issued either by radio or by telephone and fitters post their reports to customer service department each evening.

Instructions on escape procedure are printed on the fitter's emergency report form. He usually records the pressure loss (tenths w.g. in two minutes) before carrying out any work. He normally spends no more than 30 minutes on a first-aid call. If, in a domestic installation, a loss of ten tenths or more is still recorded or there is a smell of gas, he makes the job safe and telephones back the details. The job is passed to an installation fitter and the emergency fitter is free to make his next first-aid call. Escapes found to be outside the premises are referred to the distribution department, but the fitter stands by until they arrive.

Maintenance work is treated as second only to emergency work in priority. The main object is to correct the complaint at the first visit. Fitters who specialise in this work carry an assortment of small parts, including governor diaphragms, washers, jets, caps, lighter parts and the like. Their kit provides for any special characteristics of the district they serve.

Each region has some fitters' depôts distant from the main stores. The problem of providing them with thousands of small parts can be a difficult and costly one. One arrangement, where a supervisor operates a mobile maintenance unit, has been used successfully in two regions.

Work of supervisor

The van is fully stocked with small parts, including water heater bodies and burners. The supervisor controls about 15 maintenance men based at three different depôts. He meets the men at the depôt nearest the main stores at the end of the day, hands out the next day's work and receives back cash and completed papers. The men replace materials used and collect additional items. The supervisor meets the men at a second depôt in the morning and the men from a third depôt by arrangement on the district. For the remainder of the day he visits men who need extra materials or advice on difficult problems. He returns to the stores in the late afternoon, hands in requisitions and collects any special items his team needs. In this way, maintenance planning is greatly simplified and it is no longer necessary to keep a stock of appliance 'bits and pieces' at the three depôts.

The normal work capacity of each team is known to the work control section. There will, of course, be variations, mainly because of sickness and unfinished jobs. The supervisor therefore contacts the allocation clerk daily to confirm or amend his next day's requirements. Holidays will have been notified in advance and due allowance made.

Customer service

A normal 'planned' job may be carried out either on the first or second working day after delivery. A job not carried out on the first day automatically assumes the priority of a 'promised' job. If a promised job cannot be done on the day, the customer is notified promptly.

In some districts one or two of the installation fitters telephone the emergency despatch desk twice a day. They take any follow-up emergency works and jobs received at short notice from 'customers on the move.' Special arrangements for new property work vary according to local needs.

In each region one supervisor works to a programme set by the Board's Market and Operational Research Manager. He examines random samples of work to a uniform standard of inspection and reports on standard forms. These are analysed and statements are prepared for the Commercial Manager. These reports have greatly influenced installation policy and practice and led to considerable improvement in the quality of district work.

The quality control supervisors are presently carrying out a special investigation into enamel damage—a serious and increasing problem. Its solution would, as much as any other single factor, improve the efficiency of our service organisation.

The re-organisation meant a complete upheaval in the work of almost all our staff. Hundreds of clerks and district staff were interviewed and appointed to new jobs. Special training courses had to be arranged for telephone receptionists, service layers and many others. Similar reorganisations were taking place at the same time in production, distribution, accountancy, stores, transport and almost every other department.

The whole operation was in fact completed with far less difficulty and in shorter time than could possibly have been expected. This was due, more than anything else, to the high level of co-operation between the various functional departments, both at the top and down the line.

The dust has now settled and the new organisation is working well. But it is by no means perfect—and probably never will be! Every complaint of a failure in customer service is investigated to see how the Board's practice can be improved. If an individual has failed, steps are taken to see that neither he nor others make the same mistake again.

Every week we carry out over 15,000 jobs large and small in customers' premises. Most of them are carried out in a manner which is a credit to our employees and the Board. Our aim is to change 'most of them' to 'all of them.'

DISCUSSION

Mr. J. A. Buckley, Sales Manager, North Thames Gas Board, said he found it very difficult indeed to quarrel with anything the author had said. 'For example, Mr. Foulis said it is important to answer enquiries promptly, but far better to avoid them altogether. How true this is and how important it is to plan a service organisation with sufficient flexibility to avoid the 'snowball' effect that occurs when delayed service is followed by inadequate information—the comparatively straightforward job becomes a complicated tangle of pieces of paper and repeated enquiries, etc.'

He always found, as a Service Supervisor, that the eternal law of cussedness seemed so often to prevail on these occasions—'let one thing go wrong and there is a strong likelihood of many others doing so as well.' He also found himself giving 99 out of 100 for the statement which read 'only one chargeable job in 100 needs an individual estimate.' This became increasingly important as we extended our selling outlets to canvassing dealers, shop dealers, agents and the like, and he was sure that the damaging effect on sales of post-selling fixing charges was still not completely appreciated generally.

The objective of providing salesmen's clerical support, resulting in the salesman being free to spend his time selling, was, of course, excellent, but he would be grateful for a little more information as to exactly how this was done without incurring heavy clerical costs. For example, Mr. Foulis said the salesman was not expected to write up job tickets, but later in the paper we were told that requests for estimates were written out by sales representatives on a 'request for estimate' form, in triplicate, and the materials needed were listed on the back of the form.

There were, he felt, two conflicting principles at work in the approach to this sort of problem, on which he would be grateful for Mr. Foulis' comments. One was the need to simplify clerical routine and cut down the number of pieces of paper in the system; the other was the desirable objective of giving clerical staff the task of filling in forms, and not the salesmen. It seemed to him that in the desire to pursue the latter, one might use two pieces of paper where in fact one would do.

Since Mr. Foulis' organisation had gone a long way in a direction with which he thoroughly agreed on stan-

dardising fixing charges, he wondered whether he had also taken this further to the point of standardising fixing techniques and material.

The North Thames Board was due to launch a water heater campaign in March and was now in the position of having one fixing charge for all sink heaters (other than the boiling water heater which required a scale reducer) providing suitable gas and water points were in the room. 'The fitter will be issued with a standard kit of fixing materials which do not need to be itemised separately when ordered, and which have been specially selected for their ability to cope with all reasonable situations, other than the length of pipe which is, of course, specially specified.'

The use of the telephone and the advanced techniques which the Southern Gas Board were employing were most interesting, and it was apposite that both Mr. Foulis and Mr. Marples were apparently thinking on similar lines until Mr. Marples decided to desert the Post Office for the 'Pink Zone.' He imagined the trend towards reducing the price of the longer distance calls would continue with automation in the Post Office, and Mr. Foulis' integrated telephone schemes would more than ever come into their own.

Family tree complications

Mr. Buckley was just a little puzzled in sorting out the 'family tree' of the commercial department which appeared in the paper. He thought we all found these chains of command fascinating and whereas at the top level the position of the Commercial Manager and his Principal Officer seemed very direct, he found himself rather puzzled when looking within the regional sales and service organisation to find that there were senior technical representatives, senior district representatives and commercial representatives, the latter being on what looked to be more the service side of the organisation rather than the sales side. No doubt Mr. Foulis could explain this very simply. He would also like to know the different functions of the district salesmen and salesmen/surveyors, and whether this relatively high degree of specialisation was found to be difficult to apply economically over the wide area of the Southern Gas Board.

In conclusion, as one responsible for sales, he readily admitted that the sales department was only as effective as the administrative and service departments allowed it to be. With the sort of streamlined efficiency portrayed by Mr. Foulis' paper, he was sure that the Southern Board sales would be hot contenders for championship honours in the season 1960-61.

Mr. Foulis, replying, said that the Board did not go to the extent of providing clerks for salesmen, although it was starting to make life for the salesman easier by providing 'prefabricated' hire purchase agreements in showrooms. He mentioned that when any office system was criticised, the critic invariably added more paper work to it. If a particular job was more than a 'connect' assignment, the salesman had to make out a pre-printed requisition form. At no subsequent stage was the form re-typed.

Referring to the standardisation of installation methods, Mr. Foulis said that the fitters' kits had been in use for 20 years. They were bought in bulk, ready assembled, so saving work in the stores.

The 'family tree' to which Mr. Buckley referred was perhaps more 'baffling' than 'fascinating,' said Mr. Foulis. A salesman surveyor was an employee qualified by his technical background to survey such jobs as multi-points, etc. He had, in all probability, served as an apprentice or as a fitter.

Mr. T. M. Caswell, North Thames Gas Board, referred to p. 7 of the paper, relating to production time of fitters. In his Board, the system was to use summary sheets which were figured out weekly on a competitive basis with various depôts. Men with poor productive time were called in and interviewed to discover the cause. Not more than six out of eight working hours were productive time. In dealing with escapes, referred to on p. 10, Mr. Caswell reported that the North Thames Gas Board's system was to allow the fitter who discovers an escape to stay with it until the supply is cut off. The same fitter is present when the supply is resumed; he then checks all appliances on the premises for efficiency. One point raised was that most consumers did not welcome muddy-booted men into their homes. He asked Mr. Foulis if his Board's district men went over premises to see if all was well after an escape had been repaired.

On p. 12 Mr. Foulis mentioned the work of quality controllers in eliminating enamel damage to appliances. Mr. Caswell said that although his Board was trying hard to reduce such damage, and some good results had been obtained, there was no overall system for preventing damage. He mentioned the publicity which the Board did in informing interested parties of the damage which could be caused by bad handling of appliances, and mentioned meetings with warehouse staff. Did Mr. Foulis think that more elaborate packing of appliances was the answer? Had the Southern Gas Board carried out any research into the increased cost of such packing?

Replying, **Mr. Foulis** said that the production figures quoted in the paper were for planning purposes. There was no implication, he hoped, of 7½ hours actual work. He reminded Mr. Caswell that the working day of the Southern Gas Board was longer than that of the North Thames Board. The men in his own Board's area worked, on Mondays, from 7.30 a.m. to 5.30 p.m.; an hour longer than Mr. Caswell's fitters. From Tuesday to the end of the week, working hours were from 7.45 a.m. to 5.30 p.m. He said that one must bear in mind a possible differential between the times quoted in his paper and actual recorded times. He reiterated that his times were theoretical, for planning purposes.

Answering another point of Mr. Caswell's, Mr. Foulis said that fitters in his area were free to leave premises after the gang had arrived. Men in service teams wore, when the occasion demanded, plastic overboots to protect consumers' property. About damage to enamel, Mr. Foulis said that investigations carried out by his Board were complete, but the information accumulated had not yet been analysed. Although his Board was using a statistical method to get to the bottom of this 'appalling problem,' it was no nearer a solution than any other Board. He would, he said, welcome any information on this subject.

Mr. J. V. Rigg, Watson House, drew attention to p. 5 of the paper, on the use of telephones. He understood that several overseas countries used a 'storage' system for consumers' calls, whereby the request was recorded for the day shift men to deal with.

Mr. Rigg mentioned that in pre-war days, it was possible to pay a small charge when buying an appliance for annual service. Did Mr. Foulis know of a similar method working today? He had referred to 'quality control supervisors.' Were they service supervisors, or members of a special branch to deal with enamel problems?

Mr. Foulis replied that after much discussion it had been decided that the method of storing calls was perhaps more applicable to a bookmaking business than to the gas industry. There might be certain sections of the organisation which might be able to use this system, but compared with the cost, generally speaking there was little use for it.

About service charges, Mr. Foulis said that a differential

ought to be kept between electrical and gas appliances. It was no longer true that gas cookers, for example, were cheaper than electric. The subject of service charges was one of considerable urgency, which ought to be dealt with nationally, perhaps by the Commercial Managers' Committee.

He went on to say that quality control supervisors did investigational work on the district, on the maintenance, emergency and installation aspects. Basically, they worked to a pattern set by the Commercial Manager.

Mr. G. S. Davies, South Eastern Gas Board, asked Mr. Foulis how he managed if no regional records were kept of customers' accounts (p. 9). He referred to the statement in the paper on p. 10, 'If . . . a loss of ten tenths or more is recorded. . . .' He wanted to know what happened if the escape was nine-tenths or less?

Mr. Foulds, referring to the accounts query, replied that should a customer want, for instance, to pay the balance on the price of an appliance she had, a standardised card would be forwarded to the central accounts department of the Board. The settlement was then despatched to the customer by post. In the case of disputed gas accounts, it would be of little help to refer to past records. In such a case, an offer would be made to have the meter reading checked. An alternative was to inform the customer that, for a standard charge, she could have her meter Government tested. Mr. Foulis repeated that in the majority of cases it was of no assistance to keep such records handy.

Mr. G. E. Johnson, Watson House, asked if a customer had an appliance delivered to her home over the weekend, would the installation work be sub-contracted out, or would it be done by the emergency fitters?

Mr. Foulis informed him that for work done at such a time, an installation charge at overtime rates would be made for the work done. In general, no work of this nature was sub-contracted out. A shift fitter would be detailed to the job, not an emergency fitter.

Mr. N. R. Junkison, North Thames Gas Board, said that it was essential to sell not only the fuel, but the service which went with it. Regarding maintenance, he asked if there was any planned maintenance for commercial consumers; were there any special services to hotels and the like to ensure that gas appliances were seen in the right light? What arrangements were made for specialist fitters to answer industrial enquiries, some of which might be quite urgent? Was there a workshop fitter available at short notice?

Regarding sub-contractors, what arrangements had the Board made to ensure that work was carried out in the manner and at the time required? Mr. Junkison mentioned the increasing number of gas appliances which had electrical parts. Had the Board any special arrangements for servicing such appliances?

He added that when he visited the headquarters of the Southern Gas Board he was most impressed with the internal communication system.

In reply, **Mr. Foulis** commented that it was not possible to achieve such a degree of specialisation as the Special Services Division of Mr. Junkison's Board. However, top priority was given to industrial work. Emergency teams dealt with any complaint essential to the running of homes or industrial premises. Additionally, routine visits were made quarterly or half-yearly to industrial installations. Specialist fitters were used on some jobs. He agreed that appliances were becoming more complex and said that at the present time some appliances were handled by gas fitters and some by electrical contractors. Mr. Foulis mentioned the Southern Gas Board's three workshops in Portsmouth, Bournemouth and Reading. Specialist men were sent out for urgent jobs from there. The Board would like to restrict work given out in sub-contracts, for the standard of work was invariably lower than that of the Board's men. Because the British Motor Corporation factory in Oxford offered considerably higher pay for unskilled workers than a first-class gas fitter was receiving from the Board, there was a shortage of skilled men.

Miss Joy Houghton, Watson House, said that when a sale was made every effort ought to be made to have the appliance fixed within the stated time, no matter how far off this time was from the purchasing date.

Mrs. Eileen Murphy, formerly of the Gas Council, asked Mr. Foulis if the re-organisation of the Southern Gas Board since 1956 had paid off?

Mr. Foulis replied that consumption of gas was not increasing; the most the Board could do was to sell more appliances. He said it was a reasonable claim that sales were more successful than ever, and prophesied further increases in the future.

Mr. J. E. Steel, a member of the Council of the Association, proposed a vote of thanks to Mr. Foulis.

British Standard for welding operations

AN interesting new feature of a revised British Standard, B.S. 679:1959, is its inclusion of plastics as one of the materials from which the welding filters may be made. The choice of materials is now wholly glass, or plastics with external glass surfaces, or wholly plastics.

Another change concerns requirements for refractive properties. They have been amended in accordance with the recommendations of the opthalmological panel of the Ministry of Labour, thus bringing them into line with recent revisions of standards dealing with lenses for eye protection.

Besides specifying materials and refractive properties, the standard deals with quality of workmanship, optical uniformity and performance. Appendices contain detailed methods of test relating to the exposure of the filters, to heat, moisture, and ultra-violet radiation. A flammability test requires the material not to burn at more than a specified rate per minute. A further modification is the discarding of 'grades' of welding.

Simplified identification

The standard uses a simplified method of identifying filters according to their shade numbers and uses only. A note explains briefly the purpose of B.S.I. certification, the kite-marking scheme. Although, in this standard, use of the mark is optional, it is hoped that many manufacturers will take advantage of the unbiased confirmation of quality it affords and that purchasers and users will wish to give preference to filters carrying the mark.

Copies of this Standard may be obtained from the British Standards Institution, Sales Branch, 2, Park Street, London, W.1. Price 5s. (Postage will be charged extra to non-subscribers.)

Training course

In the ultrasonic method of weld inspection, responsibility for the identification of internal defects lies with the operator using the equipment. The acceptance or rejection of the weld depends upon the operator's interpretation of the trace on the cathode ray tube. To provide training for such operators the Institute of Welding has held in London its first practical training course—with co-operation from equipment manufacturers. The course was held as the result of many requests.

Belgian gas supplier builds storage tunnels to take off-peak l.p.g., cut freight costs

By LESLIE T. MINCHIN

BELGIUM has no gasworks (in the English sense); the supply of coal gas comes almost entirely from coke ovens. Since the war this supply has been supplemented by a certain amount of methane drawn from the coal-mines of Mons and Charleroi, and at the present moment—in spite of the sad conditions of the Belgian collieries—this source is contributing about 7 mill. cu.ft. a day of methane. The cracking station at Ste. Aldegonde, near Binche, which was first constructed for the treatment of firedamp, was also able to crack l.p.g.

With the development of the new oil refinery at Antwerp this aspect has become more important, for it is an excellent means of making gas in winter time with relatively inexpensive plant. It is easy to see that with the main sources of gas working at level output throughout the year the problem of supplementing them in cold weather without excessive capital expenditure is particularly urgent. At present 50 mill. cu.ft. of gas per day can be produced by cracking plants in Belgium, and in 1961 this figure should have risen to 70 mill. cu.ft.

The agency mainly responsible for gas supply is the pipe-line company Distrigaz which owns the high-pressure grid supplying nearly all the big towns of Belgium.

Valuable to economy

This company, which belongs to a type of organisation unknown in Britain, buys gas where it can, makes more if necessary, and then sells to the local gas undertakings or to large industrial users within the area of its pipe-line network. Its rôle is similar to that of the Ruhrgas A.G. in Germany, and one cannot fail to be impressed by the valuable part which it plays in the national economy. The Technical Director of Distrigaz, M. René de Brouwer, must be classed as one of the outstanding gas engineers of our time; he has—among other things—been one of the chief pioneers in cathodic protection, and some of the Distrigaz network has been protected in this way since 1933. His work in the commercial exploitation of firedamp has been no less remarkable.

The technical project which is now engaging M. de Brouwer's attention very closely is the construction of a vast underground reservoir for the storage of l.p.g. so that the propane and butane produced by the Antwerp refineries can be accepted, even in midsummer. This will, it is hoped, obviate the need for importing l.p.g. from other countries and so cut out the rather heavy freight costs involved at present.

Acting on the advice of their consulting geologist, Prof. Kaisin, a thick bed of 'boom-clay' under Antwerp Harbour is being used. This lies 80 ft. below the surface, and goes down to a depth of 350 ft. The reservoir will be formed by two sets of tunnels 20 ft. in diameter bored in the clay horizontally. It has been computed that the hydrostatic pressure of the overburden will then be far more than that needed to contain propane and butane in the liquid form at the temperature of the ground cavity. One set of tunnels, to contain butane, is being built at 170 ft., and the propane reservoir, similar in all other respects, will be at 250 ft. deep.

The first stage in construction will be the sinking of a 10-ft. shaft on the north bank of the River Scheldt. The work will be done by the mining engineering firm Foraky, and the passage through the top layer of sand will be made by the refrigeration process. When the shaft has been sunk to the required depth the work of excavating the actual reservoir tunnels will begin. These will be horizontal, lined with prefabricated concrete rings, and joined at each end to a connecting tunnel so as to form a rectangular grid. When the work is finished, a gasproof stopping will be made between the shaft and the storage tunnels, and all the filling and the emptying of the reservoir will be by means of a 3-ft. borehole at the other side of the system. The main shaft will be maintained in good condition and ventilated, since it will be useful if at a later date extensions of the system have to be made.

It may seem surprising that at this stage extensions should be in mind, for the geometric capacity of these two systems due to be finished by July, 1961, is 700,000 cu.ft. If this were completely filled with liquid hydrocarbons it would correspond to a gas volume of 175 mill. cu. ft. Multiplying this by a factor of 6.3 to obtain the equivalent in 450 B.t.u. gas, it appears that the reservoir will in fact correspond to about 1,000 mill. cu.ft. of town gas. While this is a very useful amount, one can see that it represents only 20 days' supply to the cracking plant now installed. Doubtless if it proves satisfactory the reservoir will be extended—possibly under the river bed. By way of comparison, it may be of interest to mention that the underground storage installations at Hanover and Versailles—where town gas is compressed in porous sandstone strata—have capacities of 4,000 and 10,000 mill. cu.ft. town gas respectively.

New dock being built

The site of the storage installation is a 15-acre plot on the north bank of the River Scheldt, in Antwerp Harbour. A dock is being constructed here for the purpose of accommodating tankers bringing l.p.g. for storage or taking it away to the cracking plants. Road tank-wagons are also used for the latter purpose, and a permanent pipe-line will be constructed to carry the liquefied gas from the Antwerp refinery to the storage installation.

The method of cracking used by Distrigaz is principally the autothermic process, though the original plant at Ste. Aldegonde employing externally-heated tubes still exists and is used at times. The autothermic process is more efficient—98% is claimed—and is very flexible, but the gas produced is rather heavy and slow-burning. This limits the proportion that can be added to coal gas without seriously affecting the performance of appliances. One way of overcoming this difficulty which has been found practicable in Belgium is for a special tariff to be given to large industrial consumers on the understanding that they will accept 100% cracked gas at times of peak load.

From a paper to the Wales & Monmouthshire Junior Gas Association, Aberdare.

Construction of small diameter high-pressure grid gas mains

By S. N. P. NELSON, M.Inst.Gas E., M.Inst.F.,

and

H. BREEZE, D.F.C., A.M.Inst.Gas E.

FOR the construction of the greater part of the North Wales gas grid and for the Western Section of the South Wales grid, American pipe-lining methods, suitably modified for conditions in this country, were used. The success which attended both these projects led to the conclusion, that, with further modification, such methods might be adopted for the laying of the smaller diameter high pressure pipe-lines, both quickly and economically, to supply the small and remote undertakings.

The authors have been responsible for the organisation and operation of two construction units, one in North Wales and one in South Wales. The units were formed, after careful preparation, to lay small diameter pipe-lines using the modified pipe-lining methods. Each unit is responsible for the selection of grid main routes, preparation of estimates, organisation of plant and labour, and the construction of the mains. These units are self-contained and all the administrative work is carried out in mobile site offices. An essential feature of the system is that weekly records of progress and costs are maintained so that proper control may be exercised and the financial state of the work immediately available.

The materials required for pipe-lining are all to a higher standard than for normal mainlaying. The pipe itself is in random lengths of 35 to 40 ft., and is made in accordance with the American Petroleum Institute's Specification A.P.I. 5L grade B, in our case. Below 6 in. n.b., the pipe ends may be belled out for a few inches to make a sleeve for receiving the spigot end of the joining pipe or it may be that the pipe ends are chamfered to a welding angle of either 30° or 37½°.

Priming compatability

These pipes arrive on the job protected only by the makers' priming coat. Arrangements for applying the final protecting coat of coal-filled enamel, reinforced with fibre glass tissue and the whole protected by an outer wrap, are usually done on the site by subcontract. While much of the makers' priming coat is subsequently removed by cleaning, it is important that the material used in the manufacture of this priming coat is compatible with the material to be used by the wrapping contractor.

The long lengths of small diameter pipe are very flexible and field bending for small angles can easily be accomplished by improvisation. For larger angles standard tube-turns or fire bends must be provided, since generally speaking, mitred bends are not permitted as they could preclude the use of cleaning pigs. Welding neck flanges and any other flanges are to B.S.S. Table F. The pipe used for pressure points is of special weight.

In general the valves to be fitted in the line are of the full bore type and in sizes of 3 in. and above are welded directly into the line without the use of flanges.

Perhaps the most important factor affecting the selection of any route is the quality of the gas to be transmitted and its degree of saturation. In the design of pipe-lines for the transmission of dry gas there is no necessity to consider laying the pipe-line to gradients.

Natural contour advantage

Gas drying is a subject not within the scope of this paper, but our experience shows that the bulk of the water vapour still present in the gas after compression and after cooling is deposited within the first mile or so of the compression station. It is preferable therefore, that the first section of the line be laid to a gradient to allow for the possibility of such condensate, but thereafter advantage can be taken of the natural contours of the ground, thus effecting very considerable reduction in construction costs. With some idea of the general direction of the route, the first essential is to fix the points at which major obstacles such as rivers and railways can be most readily crossed, and what areas should best be by-passed. So far as is possible routes are selected which avoid laying in roads, where excavation and reinstatement costs can be high and the rate of progress necessarily slow.

It is essential that the parties selecting the route should have experience of the method of pipe-lining to be adopted and of the type of plant which will be in normal use on this line. Access to the pipe-line both during construction and for future maintenance must also be considered. In remote country and hilly districts it is possible to go across country for many miles without encountering even farm tracks. In fact we have come across many farms where because of the need for crop rotation, fields are short cultivated in order that the farmer himself could gain access to his farthest fields.

The whole of the route should be carefully walked and local people contacted because in a country with a long history one stumbles across ancient monuments and barrows and if not found until after pipe-lining has commenced can cause expensive and long delays. Fields having very little top soil on top of rock, and these can be readily seen, should be avoided if at all possible since, in spite of all efforts much of the top soil will be lost, and much surplus rock will need removing from the site and new top soil imported. Natural wells supplying farm houses with drinking water should always be avoided by as great a distance as possible. In any case enquiries should be made in an effort to locate the source of the

water feeding the well. In one instance our trench cut across the flow of water to a well and it took a great deal of time and money to restore the supply.

Finally the route must be such that all valves, pressure points, drips and corrosion test points are in hedge banks or in grass verges where they are easily accessible for maintenance. Care in the positioning of such points also facilitate wayleave negotiations.

With the route decided upon a list of the names and addresses of the land owners and tenants is compiled either by local enquiry or by the employment of a land agent who specialises in the management of estates. From this information the following plans and documents can be prepared.

1. A 6-in. Ordnance Survey sheet showing the proposed route, position of valves, etc., for the use of the Land Commissioner, farmer's unions, highways and all statutory authorities.

2. From (1), 1/2,500 Ordnance Survey plans are prepared repeating all the above information but on a larger scale and including detailed references to boundaries of owners, etc.

3. From (2), separate wayleave drawings, for the preliminary use of valuers, engineers and solicitors during wayleave negotiations, are prepared. These can be parts of the 1/2,500 sheets.

4. Schedules are then prepared giving the names and addresses of owners and tenants, the wayleave drawing or print numbers the Ordnance Survey field numbers, the total yardage involved and any remarks which may be necessary. The owners are then communicated with, either directly by the Board, or by the land agent if one is engaged for this purpose and negotiations proceed between the respective valuers and solicitors, the engineer being called in to discuss or advise on diversions or other technical matters. Often it is possible to obtain consent to enter the land before the legal documents are engrossed. Experience shows that a working wayleave of 30 ft. is desirable. A lesser width can lead to trespass, the compensation for which can exceed any saving effected by reducing the width, and will undoubtedly upset the relationship between the parties concerned. The practical width of the wayleave is governed by the size of the pipe and therefore the amount of spoil to be excavated and also by the type and volume of the plant to be used. In certain circumstances as for example when crossing individual fields of unusually valuable crops, a restriction on the width of wayleave can be accepted, but this tends to create a bottleneck and a retarding of progress. While a general wayleave of 30 ft. is required gaps in hedges can be reduced to 20 ft.

Function of valuer

A professional valuer is retained by the Board to deal with claims for compensation for loss of crop and surface damage, and to act in his professional capacity in the Board's interest. He usually negotiates with the land owners' and tenants' valuer. Before any spread operations begin he is supplied with a full set of 1/2,500 scale plans, wayleave drawings and a set of schedules. The valuer then carries out an inspection of the land involved, noting conditions and type of crops at the date of entry. This is often done in company with the owners' or tenants' valuer, or the respective valuers may work independently. Throughout the construction work he is available to assist with any difficulties which may arise, and after final clean up he investigates claims submitted against the Board. It is advisable to maintain a record of dates of entry into the individual fields of each of the spread units, in order that the valuer can assess the inconvenience and loss to the farmer for the time that access is restricted by open trenches, etc.,

While tenants of farms are responsible for the maintenance of hedges, banks and ditches on their farms, many of the large estates employ land agents as estates managers and it is these agents who will make all the necessary arrangements with the Board. Ofter they have specifications for the reinstatement of land drains, hedges and the planting of quick thorns. Requirements vary considerably throughout the country, some tenants preferring to do their own reinstatement and obtain monetary compensation in lieu. In any case it is advisable to reach an agreement before reinstatement is begun.

Any scheme for the extension of grid mains is carefully examined, and in the first instance a rough estimate is made of the probable cost to determine whether the scheme is likely to prove economic. A detailed estimate is next prepared under four main headings:

1. Cost of pipes and special fittings including as appropriate pipe coating by contract.

2. Cost of pipe-line construction.

3. Cost of wayleaves, legal fees and compensation for surface damage.

4. Cost of final reinstatement of roads and paths by local authorities.

Costs under heading (1) are straightforward. Heading (2) is sub-divided into a number of sections dealing with individual spread operations and extra over items thus: (a) Cost of site office and stores, (b) pipe handling on site, (c) wayleaving, (d) stringing, (e) excavation, (f) line welding, (g) above ground testing, coating inspection and joint protection, (h) pipe laying and repair of land drains, (i) tie in welding, (j) backfill, (k) final reinstatement field and hedges, (i) general transport, and (m) extra over items such as road works, rail and river crossings, etc.

Weekly progress rate

For construction work it is first necessary to determine the time required or specified to complete the work and then to calculate the weekly rate of progress and the plant and labour requirements to maintain the rate; for example, pipe stringing: (1) One tractor driver per week; (2) two labourers per week; (3) subsistence where applicable; (4) insurance and sick pay; (5) one tractor fully equipped for road use; (6) one pole trailer.

The total estimated cost per week is divided by the required footage per week and this gives the estimated cost per foot for pipe stringing. Each of the other spread operations is similarly estimated, together with added costs of special crossings, etc. In addition allowance is made for supervision and clerical staff, wet time and off-site preparation and any other overhead charges. All these estimates are reduced to a cost per foot of pipe laid.

A good deal of experience has been gained, particularly of pipe-line plant during the construction of two major grid mains by American pipe-lining methods, and considerable thought has been given to the choice of plant for 'small pipe' projects.

We had in mind rate of progress of a mile or more per week and had thus to acquire plant to ensure that each of the spread crews could maintain that progress economically and efficiently, irrespective of the type of ground and with due allowance for such contingencies as wet weather. There have been major developments in the design and construction of agricultural machinery since the war, and farm tractors have been adapted to do many new jobs, and already the same tractors were being adapted for building and civil engineering work. We decided to standardise our plant so far as possible on one or two of the well-known types of tractor, for which ser-

vicing and spare part facilities are available easily and quickly all over the country. Some of this tractor mounted plant and its operation is described later, but it should be said here that while we considered standardisation desirable, we had first to be sure that we had the right plant for all sections of the work.

There is no doubt in the mind of either of the authors that the ideal machine for the bulk of excavation was the Cleveland 110 wheel bucket excavator which has frequently given us over 3,000 ft. of trench per day. It is a simple, light and fast excavator, and on the machines used diesel engines had replaced the original petrol engines.

No single machine can cope with all types of ground which might be encountered at speeds at which we were aiming, and so we have following behind, one of the crawler mounted or wheeled tractor mounted backactors.

For the backfilling of trenches we no longer use a bulldozer which of necessity works on the 'spoil' side of the trench causing additional surface damage, instead, a small dragline machine is fitted with a specially designed and very easily made 'blade' or 'bucket' operated by the drag and boom ropes as the machine moves along the right of way.

The labour force comprised skilled welders, foremen, plant operators, drivers and labourers. Many of the latter quickly acquire the special skills peculiar to pipe-lining and become known as 'skid hustlers' (men whose job it is to see that packing timbers are carried forward ahead of the welders), 'line-up men' who set up the pipes in long lengths for welding and 'stringer boys' who make up the crew stringing pipes out in the fields. Many are prepared to move about with us from job to job, and their numbers are made up with casual men from local labour exchanges.

Before construction starts a site-office and stores are set up at a convenient point on the line. It consists usually of a caravan office with telephone, stores-hut and an area of ground suitable for the storage of the various materials which are not delivered directly to the right of way. Everything relating to the particular project is controlled from the site office, including daily plant and time sheets, wages, progress records, plant hire, and all land owners' enquiries, etc. It is usually convenient to arrange for the pipe-wrapping factory, caravan office and stores to occupy the same site.

Summary of costs

Line progress for each crew is recorded daily, 'extra overs' such as rock excavation, valves fixed, etc., are measured, and the footage to date is obtained by reading the finishing pegs. Materials used are entered weekly from the goods issued vouchers. From this information, and by reference to the detailed estimates, the weekly progress can be evaluated. A weekly cost statement is prepared, which is a summary of the costs calculated from the daily time sheets of labour and plant—including hired plant—and from stores records of materials used.

A cost is also allowed, based on the footage of pipe laid for the week, for wayleave, compensation for surface damage, and for work such as pipe-coating which is carried out by sub-contract. To these costs must be added a carefully calculated percentage for works and administration overhead costs. All overhead charges will have been allowed for in the estimates, and their percentage of the estimated job cost is used initially in the weekly cost sheet, being adjusted as actual costs are revealed during the progress of the work. Where actual costs of certain materials or of plant hired are not invoiced or known, they are estimated. Adjustments are made weekly as invoices are received for items previously estimated, so that at the end of the job there should be no major sum to add which would upset the cost system. Comparisons week by week of job cost and job value keep the engineer fully informed of the financial state of the job, thus enabling him to exercise the best possible control of the work. It is from comparison of cost and value that incentive bonus payments may be calculated weekly.

When spread operations have been begun, the first step to be taken in setting out the route is to peg it out and mark out the boundaries of wayleaves. This is best done by a draughtsman surveyor who has, prior to the work commencing been assisting in preparing the numerous plans and sending them to the various interested parties. Before the surveyor begins pegging or setting out the route, he contacts the tenant farmer who is usually fairly helpful and will offer advice as to the position and depth of land drains. It is at this juncture that despite the care taken in route selection one finds the odd well in the line of the main or an underground culvert no one thought fit to mention.

Route marking

Route marking consists of driving in wooden pegs at chained intervals of 100 ft. along the line of the pipe and in addition at turning points, etc. The first of these, a $1\frac{1}{2}$-in. square sawn peg, marks the centre line of the trench. The second, or chainage peg, of 3-in. by 1-in. section and having one planed face, serves several purposes. Set 20 ft. to the right of the centre peg it marks the limit of the wayleave width for the guidance of men and plant on the line. On the face of this peg is marked the distance in hundreds of feet from the start point '0 0,' thus the measurement of daily progress can be read for each spread unit at the finishing time for the day, and entered on the daily progress sheet. Changes of direction can be read from the appropriate pegs by line crew. Finally, peg numbers can be used as reference for any point on the line.

Wayleaving is the first operation that is actually costed, since setting out the route is counted as an overhead. A gang consists of a charge-hand and three to five labourers, a bulldozer equipped with blade and winch, and a lorry or trailer. They carry sleepers, girders, empty oil drums, scrap pipes, fencing posts, wire netting and temporary gates. Gaps are made through the hedges and the trees are moved to one side. Small rivers and streams are either graded out, or bridged with sleepers. To maintain the flow of water in ditches, scrap pipes of iron or earthenware, or old oil drums with the ends removed, are laid in the water before the earth banks are dozed over the top, thus plant travels along the wayleave width over all sorts of obstacles, and the necessity for trespass outside the 30-ft limits of the wayleave is avoided.

A two or three man crew with a tractor, fully equipped for road use and fitted with a hydraulic lifting gear, and towing a pole trailer, strings out loads of pipes end to end ready for lining up and welding. A winch and 200 ft. wire rope fitted to the rear of the tractor has proved most useful in swampy ground, where it has not been convenient to bring the wayleave dozer back to assist the stringing.

With regard to trench excavation we find that there are two schools of thought. One which believes that the trench should be cut ahead of welding and the other, that it should be cut only when the pipe is prepared and ready for lowering. Both have their advantages.

If the trench is opened only when there is a pipe ready to be lowered, the minimum of inconvenience to farmers results and in addition, trenches in bad ground do not have the chance to collapse and require re-opening at great expense. However, excavation cannot have the same uniform rate of progress as welding because of so many different types of ground may be encountered, and only

by keeping plenty of open trench ahead can the spread crews be sure of having a continuous line of pipe buried, without the need for leaving out loops in patches of rock, etc.

The trench is cut in two operations. First, topsoil, which we always endeavour to preserve, is taken off by means of a single furrow deep plough mounted on a small tractor. The depth of cut is variable to suit the different types of ground and averages 9 in. Where there are but 2 or 3 in. of soil on rock, greater effort must be made to save it for in such areas, soil is in short supply and cannot be purchased to replace that which is lost. The major part of all our excavation is carried out by the Cleveland type of excavator. The machine is set to dig wherever it can, and is followed by a backactor, either crawler or wheel tractor mounted, which, although very much slower in operation can open trenches in ground unsuited to the Cleveland. For rock excavation compressors and breakers, again tractor mounted, are brought up, and where necessary, blasting is resorted to. The combination of Cleveland trencher and backactor has proved very successful in maintaining good rates of progress.

Ahead of the welders, the line up crew pull a cleaning brush through the pipes to remove dust and loose material, clean and wire brush the pipe ends, and set the pipes up on timber skids at a sufficient height to enable the welder to reach easily all parts of the joint. For butt welded pipes they are also responsible for setting the external line up clamp while the welder's mate carefully checks the gap between the pipe ends.

The dimensions of the wooden skids used to support the pipe are important. They are 30 to 36 in. long and of 6-in. by 4-in. section, so that they can be laid flat or on edge to give support at any height at intervals of 2 in. Downhand or stovepipe welding methods are used. This type of welding has proved very good indeed, but requires to be done by really first class men if you are not to run into trouble.

On sizes 4½ in. o.d. and above the pipes are all butt welded, but sizes below 4½ in. od. are sleeve welded. While the use of sleeves assists the line up of the pipes, the resulting weld is perhaps not quite as satisfactory as a butt weld.

On all sizes of pipes, the hot pass or filter run is applied before the stringing run has cooled. This cooling must be avoided even if it means using two welders per joint on the larger size pipes. Further, it is only on very rare occasions that the capping run is not applied immediately. Over 90% of welds are visually inspected by senior supervising staff, and odd joints are cut out at random for examination.

Preparation of joints

The number of leaking welds we get is negligible, and averages about one per mile of pipe. One of the reasons for this excellence of welding is preparation of joints. All joints are wire brushed until both halves of the joint are bright and down to bare metal, sometimes it is necessary to lightly file the pipe-ends to remove rust and scale. On butt welds the gap is carefully controlled by means of a gauge.

At convenient points at road crossings, etc., sections of welded main are blanked off for air-testing above ground. A blank plate is welded at one end and either a wedge-lock type of plug, or a specially made clamp is fixed at the other. Provision is made in the blank-end for filling the main with air, for testing. It is 'blown up' in two stages, to a pressure of 100 p.s.i., and after allowing time for conditions to settle, every joint is carefully examined for leakage with a soap solution. Leaks are marked, and are repaired after the air has been released. Welding is not permitted on a pressurised main. The affected portion of the weld is cut out to permit a section of new welding.

Although the enamel coating is inspected before leaving the wrapping site, handling damage can occur in transit to the line. Before lowering in the trench all welds are wire-brushed, and painted with priming paint while still warm. Over the weld is wrapped a single layer of P.V.C. tape 2 in. wide by .006 in. thick, and over this P.V.C. tape, 3 in. by .01 in., is wrapped with a 50% overlap, giving a double thickness of wrapping over the whole length of the exposed pipe in the joint area. This wrapping overlaps the ends of the factory wrap. Any visible damage caused by handling is repaired, either by applying hot enamel over the damaged part, after cleaning and priming, or wrapping with P.V.C. tape. Finally the whole length of the section is examined with a holiday-detector for unseen faults.

Pipe handling machinery is not required for small diameter pipes. A small crew of men can easily lift and snake the pipe into the trench, after repairing those land drains which lie below the invert of the pipe. Depth of cover, clearance under ditches, and all other land drains are checked before the latter are repaired. Reference has already been made to the onerous conditions often required in making good damage to land drains.

Small service arrangements

To avoid the need for leaving a break in the main where it is crossed by small services, it is often possible to arrange for these to be cut and replaced after pipe-lowering, using compression joints in the case of copper pipes and junior Viking Johnson couplings for iron pipes.

Back-filling of trenches is carried out by means of the special blade, referred to earlier, which is fitted to a small dragline machine. The soil excavated by the type of trencher we use is in a finely divided form and does not normally have time to coagulate before it is back filled and it therefore goes back into the trench most readily, leaving little, if any, surplus to be removed.

As soon as possible the various lengths are tied in together to make one continuous length of pipe-line up to four miles in length in order that testing can take place before the final clean up and the replacement of hedges is done. The tie-in gang also instal syphon drips (if necessary), pressure points and corrosion points. A most useful type of machine has been developed which is ideal for tie-in work. It is a wheeled tractor with a 300-A generator mounted at the front and a 100-p.s.i. air compressor at the rear. This plant tows a trailer and carries oxy-acetylene cutting equipment, a canvas shelter and tools, which makes the tie-in crew a full self-contained unit.

The main now being safely buried, a mechanical strength test of 300 p.s.i. (air) is applied. This is invariably a slow job as any reasonably priced air compressor suitable for +300 p.s.i., has only a small discharge of air. It may take a day or two for the line to reach this pressure. In addition, delays are caused due to leakages occurring, chiefly on the flanges on pressure points, etc., and having to be repaired. After reaching the pressure it is maintained for at least 24 hours and then reduced to 100 p.s.i. for final testing. This final testing lasts for 168 hours and the pressure loss in the main is checked daily by use of the South Eastern Gas Board tester corrected for changes in barometric pressure.

This test must be most carefully carried out in practice where very short lengths of main are under test, otherwise it is easy to obtain a lower reading each day by having to re-charge the connecting tubes with the high-pressure air. One would thus suspect a leakage which does not exist. The above procedure is made necessary by having

several sections under test at the same time. After passing the test the pipe-line is purged of air, with a long and substantial plug of nitrogen. When analysis shows the presence of 100% town gas the line is shut down until the station is ready to receive gas.

The last stage in laying the pipe-line having been reached, along comes the clean-up gang. They tidy up the trench, make good subsidence, replace top soil and turf, remove all marker pegs, and complete the building of man-holes. Their duties include burning old shrubbery from 'gapping' hedges and removal of all debris, together with odd bits of pipe, etc., which may have been left by the advance parties.

After the passing of the clean-up gang it is possible that access to the fields may be limited, being confined to farmer's gates. It is on the work of the clean-up gang that goodwill is maintained and before leaving the field, the foreman contacts the farmer and walks the land with him.

Since most pipe-lining takes place in the summer it is not practicable to plant the necessary quick-thorns. Unless the owner can be persuaded to carry out his own planting of quicks and accept compensation in lieu, this portion of the work must be carried out at the correct planting season.

From the outset it has been considered essential that the maximum possible protection be given to buried pipe lines, and grid construction units are concerned mainly with ensuring that the protective coating applied to the pipe is as nearly as possible 100% sound.

Pipes are subjected to holiday inspection as they leave the wrapping machines and then again immediately before being lowered into the trench. Holidays thus located, however small, are repaired with hot enamel or with one of the accepted proprietary P.V.C. tapes. Pressure test points, drips, etc., can be used as corrosion test points for any form of cathodic protection which may be applied to the main. Additional points are necessary so that tests can be made at intervals of about one-quarter of a mile along the pipe-line. These additional points consist of a length of 1-in. steel tube welded to the main and terminating inside a small surface box.

A brass terminal fixed to the end of the tube provides any easy connection for the testing equipment. To ensure continuity of electric current flow bonding strips are welded across flanged joints. These are of the same metal as the main and their cross sectional area should be such as will not cause undue resistance to current flow. Steel strip having a cross sectional area of $\frac{1}{4}$ sq. in. has proved satisfactory. The strips are coated or wrapped in the same way as the pipe to which they are attached.

As soon as possible after the pipe is lowered, the surveyor goes back to measure and plot the actual position of the pipe-line. Details of special crossings together with the positions of valves, etc., are noted as the work progresses. From these records most of the actual agreement plans are made to replace those attached to the temporary entry forms, and the final agreements are prepared. A large number of owners, particularly of large estates ask that the position of the various land drains encountered should be plotted. This proves of assistance if flooding of the land or wet patches develop after reinstatement has been completed. For our permanent records a set of 1/2,500 ordnance survey maps are prepared on linen, on which the position of the main is plotted as laid.

These large plans may be micro-filmed and the small negatives filed away in a separate building from those housing the large plans. For everyday use, positives or negatives may be prepared of part only of the Ordnance Survey sheets.

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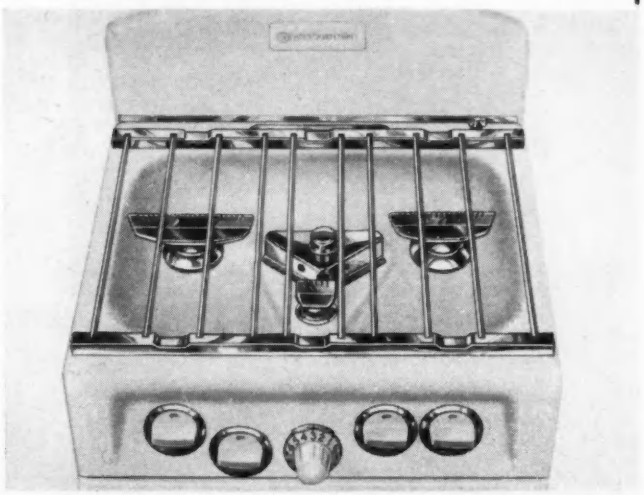

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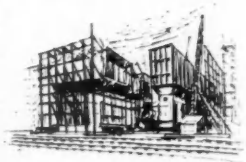

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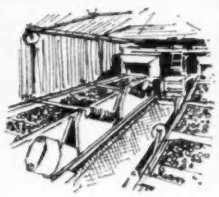

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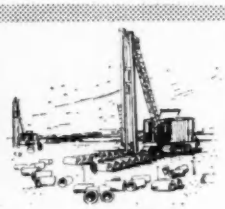

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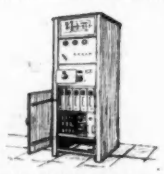

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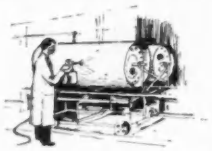

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Smoke can be killed within ten years says Housing Minister

'RELENTLESS PRESSURE' PLEDGE

NEWS SUPPLEMENT

THE Minister of Housing and Local Government, Mr. Henry Brooke, intends to maintain relentless pressure on all areas where there is smoke pollution of the air. He said in London recently that out of 1,500 local authorities in England and Wales, about 300 were in what were called the 'black' areas. Out of these nearly 200 had started to make the whole of their district a smoke control area.

Up to the end of 1959 he had confirmed 195 smoke control orders made by local authorities and 117 of them were already in force. A further 90 orders had been put up to him and were under consideration, and another 225 proposals had been notified to him provisionally. The areas covered by these 510 schemes were 105,000 acres and included about 600,000 premises.

There were about 8 mill. premises that ought eventually to come within smoke control areas so that up to the present they had firm plans that took them nearly one-tenth of the way. 'I intend to maintain relentless pressure on all those areas where there is a smoke problem because I am certain that public opinion wants the responsible authorities to act,' he said.

Intelligent use

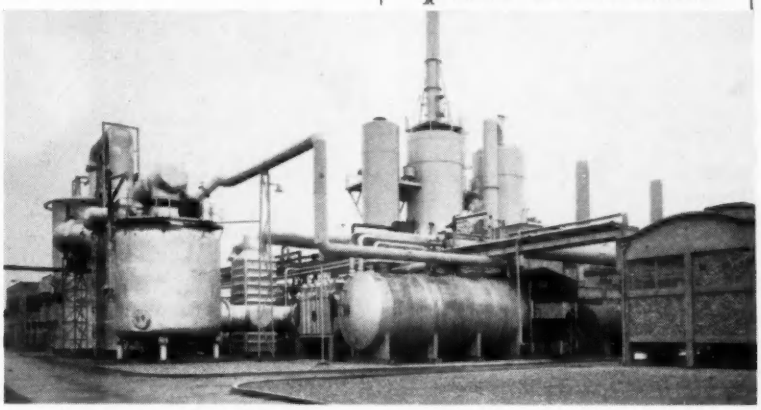
'The simple fact is that we can get rid of a great deal of the air pollution we suffer from by intelligent use of our present technical knowledge. The British public enjoys open fires and can continue to enjoy them by burning smokeless fuels: or people can change to gas, electricity or oil.'

Mr. Brooke said that in regard to some industrial processes, technical knowledge was not yet adequate to effect a complete cure. In all these cases research and development work was being pressed ahead. He believed that the country could get rid of the greater part of smoke pollution within the next ten years.

A scheme to make Edinburgh a completely smoke-controlled city has been presented to and approved by the Corporation's Health Committee. The 15-year plan is a combined effort by the city's medical officer of health, and the chief sanitary inspector. It is proposed to introduce smoke control in three phases, the city being divided into three sectors. Each sector would be smoke-controlled within a five-year period, 10,000 houses being dealt with each year.

A preliminary survey has been completed of the central area of Edinburgh, which is to be included in the first phase. Included are 1,238 properties consisting of 262 houses and 976 commercial undertakings.

Sulphuric acid plant on stream



A sulphur-burning contact sulphuric acid plant has recently been commissioned by Chemical Construction (G.B.) Ltd. at the Billingham, County Durham, works of British Titan Products Co. Ltd. This latest addition to the sulphuric acid plants of British Titan Products is one of the two largest in Great Britain and is the fifth sulphuric acid plant supplied by Chemical Construction (G.B.) Ltd. to British Titan Products.

The plant has a design capacity of 250 tons per day using sulphur as raw material to produce sulphuric acid at 98% concentration. The plant has currently been producing acid at a rate of about 300 tons per day.

The plant is of the most modern design, incorporating novel features. Sulphur is melted in steam-heated melting tanks and is pumped into the sulphur furnace via two Chemico spray burners each handling around 45 tons per day. The contact section uses a LaMont waste heat boiler for cooling the SO_2 gas and raising steam. The plant is equipped with a Chemico hot gas filter of novel design placed after the boiler and economiser. The filter is designed to enable a rapid change of the filter medium without an extended shut-down. It is estimated a complete changeover may be made in under four hours while the plant is still hot.

Aesthetic appearance

The blower room, pump room, and control room are all located under the tower structure. The control room is of particular interest. Great care has been taken in its design and aesthetic appearance. With its pale blue panel and white tile walls, apart from being a show piece it is quite an improvement in the plant operators' surroundings.

NALGO MEMBERS SNOWBALL

BRITAIN'S biggest 'whitecollar' trade union gets steadily bigger. Figures announced recently by the National and Local Government Officers' Association disclose that its membership rose during 1959 from 251,682 to 262,947—an increase of 11,265 (4.4%). Since ten branches have not yet sent in their returns, the total is now over 263,000.

Last year's increase is more than treble the average of the preceding six years. During the ten years 1948-58 (the latest for which there are comparable figures with other trade unions) NALGO's membership increased by 43%, while the total membership of all trade unions increased by only 2.7%.

Canada

Vancouver Island to receive mainland gas

APPROVAL of a plan to pipe natural gas from British Columbia's mainland to Vancouver Island has been approved by the provincial government which has authorised Magna Pipe-line Co. Ltd. to proceed with the development plans.

In recommending that approval be given the Public Utilities Commission attached provisions—principally that by May 1 the company must have a firm contract for the manufacture of a suitable underwater pipe-line, a firm agreement for the supply of gas, and file details of its financing arrangements.

The Magna Pipe-line Co. Ltd. expects to spend over $14 mill. (£5,185,180) on the project, and it is understood that a contract for the manufacture of a flexible pipe-line to be laid on the sea bed is being negotiated with a British manufacturer. The line will run from the mainland to Crofton, and serve Vancouver Island as far north as Nanaimo.

It is expected that the submarine gas main will be delivering gas to Vancouver Island not later than the summer of 1962.

Pedestal for veteran

Thought to be the oldest gas cooker in Leicester, a 73-year-old cooker has just been removed from the premises of a chemist and placed in the city's museum, where it can be seen in a display entitled 'Victorian domestic gadgets.' The chemist had been using the cooker daily right up to the time it was removed. It is marked 'Leicester Corporation No. 2758' and was first installed in June, 1887.

Ministry official tours S.G.B.

During his recent visit to the Southern Gas Board, Mr. J. C. George, M.P., Parliamentary Secretary to the Ministry of Power, acquainted himself with all aspects of the Board's activities. Here he is discussing service to customers in rural areas in one of the fleet of mobile showrooms which are proving so popular. From left : *Mr. C. H. Leach, Chairman, Southern Gas Board, Mr. W. H. Elkerton, Commercial Manager, Mr. J. F. Doran, Sales and Service Manager, Southampton Region, and Mr. J. C. George.*

'SOLID WOMEN' ON TV

The Women's Advisory Council on Solid Fuel—popularly known as the 'Solid Women'—will be the subject of a B.B.C. Television programme at 2.45 p.m. on Monday, February 22, in the series 'Come and Join Us.'

'WATCH-DOG' CHIEF DEFENDS STANDING CHARGE PRINCIPLE

LOCAL authorities should be the last people to object to fixed charges, Sir Robert Nimmo, Chairman of the Scottish Gas Consultative Council, said at a meeting of the council in Edinburgh last week. He was submitting a report on representations made by local authorities and others against the new gas tariffs introduced by the Scottish Gas Board last August.

'The prime element of the rating system in this country is the imposition of standing charges, whether or not the services are used,' he continued. 'Examples are water, libraries, education, telephones and even the National Health Service.'

Sir Robert said it was obvious that people were not aware of the reasons for the increases, or their true nature. They were due to the introduction of a new fixed charge—not a meter rent as so many seemed to think—to compensate for a substantial deficit incurred last year.

Some of the bodies which made representations did so on the ground that hardship would be imposed on old people. 'Old-age' pensioners are a State charge, and it is up to the State to subsidise them,' he added.

Sir Robert said that in view of the disappointing results of the Scottish Gas Board's experiment in opening certain selected showrooms on Saturday afternoon, carried out over the past 12 months, they had reverted to their original practice in some places. 'I am told that in most cases less use is made of the showrooms by these extended facilities than when the showrooms were open at a time when all the other surrounding premises were closed,' he said.

Liability for safe condition of gas appliances

THE liability of occupiers of premises for the safe condition of gas, electrical and other appliances, apparatus and fittings on their premises, and the duty they owe in these respects not only to their employees, but to others who might suffer injury, was the subject of an important decision in the recent case of Bleach v. Blue Gate Products Ltd.

The point of particular interest in that case is as to the onus which is imposed by the law on occupiers, and employers, as well of establishing by adequate evidence that they have not been guilty of any negligence or breach of duty, when an accident occurs.

In common use

In the case in question, a stoker and nightwatchman had the use of a small kitchen of about 770 cu.ft. He died on the premises as the result of gas poisoning from a cooker in the kitchen.

The cooker was not of a modern type, though it was one which in 1955 was still on sale, and was in common use. The taps were of the fixed fan type; they were not recessed or hinged, but fixed firmly to the shaft, and turned in the same way as an ordinary water tap. Although the stove was not equipped with modern safety devices, the tap could not be regarded as of a dangerous type. The tap was about 7½ in. from the ground, and 3 in. back from the most forward part of the oven door.

The cooker was not, however, in perfect order. The tap, the Court found, was not in the normal satisfactory condition for such a tap in such a position on such a stove. It could be turned easily by one finger with light pressure. The oven door was defective. It lacked a latch and there were no means by which it could be kept closed.

The nightwatchman was found about 5 a.m. unconscious or dead. The oven door was slightly ajar and gas was escaping. It was clear that the gas was accidentally on by movement of the tap. The employers put forward two theories to account for the accident. One was that the deceased had an attack of giddiness, and fell and upset a chair, his arm accidentally coming into contact with the tap and turning the gas on. The second theory was that he might have been sitting on a stool near the stove, when he accidentally turned on the tap by a movement of his knee.

Burden of proof

The Court, however, held that the circumstances were such as to transfer the burden of proof, as to how the tap came to be turned on, and the accident to happen, on to the shoulders of the employers. It was for them to satisfy the Court that their allowing this tap to become loose and defective was not the cause of the accident. As they had failed to discharge this onus to the satisfaction of the Court, they must be held liable.

SOUTH EASTERN GAS BOARD SOLVES DEEP-MAIN DRAINAGE PROBLEMS

Electric pumps used for condensate removal

THE condensate that collects at low levels in gas mains can cause serious interference with the supply if not dealt with and therefore, syphons are installed at these places, from which condensate can be pumped out at ground level. A tanker fitted with a mechanical pump is normally used for this purpose.

Where, however, a main descends below the level where condensate can be pumped by the tanker, the South Eastern Gas Board has installed electrically-driven pumps below ground level.

One installation is at the Surrey Commercial Docks, Port of London Authority, where a £1-mill. improvements scheme is due to be completed in 1960. The connecting channel between the Canada and Greenland Docks, known as the Canada-Greenland Passage, is being deepened and widened to allow for larger vessels.

Megator pump installation for condensate drainage at Woolwich Road, in a pit near the inspection kiosk.

One of the 65-ft. shafts of the new Canada Greenland culvert, Surrey Docks. The pump's position near the bottom is indicated by the white circle.

New culvert

This has involved driving a new culvert for gas and other services under the passage some distance to the east of the previous one. (Widening the passage has also made necessary an impressive new rolling-lift bridge in place of the swing bridge to carry Redriff Road. These works have been carried out by the Cleveland Bridge & Engineering Co. Ltd.), under the direction of the Chief Engineer, P.L.A.

The new culvert, constructed by the Port of London Authority's contractors, A. Waddington & Son Ltd., contains gas and electric mains in addition to the hydraulic power grid for dock services. It consists of two iron-lined shafts, 15 ft. in diameter and 65 ft. deep, connected by a 9-ft diameter tunnel. These generous dimensions were chosen to facilitate laying and maintaining the services, including the 12-ft. sections of 10-in. diameter gas main.

Sliding-shoe

For pumping condensate from the syphon a standard Megator M8 sliding-shoe pump supplied by Megator Pumps & Compressors Ltd. was chosen; it is mounted at the side of the shaft at a position involving a suction lift of 12 ft., and delivers to the top of the shaft.

Quantities dealt with are not normally very large; the chief requirements are reliability, self-priming and adequate suction. This pump is manually controlled from a kiosk at the shaft head and the condensate is collected for disposal by the tanker vehicle. Such condensate sometimes contains rust but, despite this, regular maintenance is not expected to be required, owing to the automatic compensation for wear that is a well-known feature of these sliding-shoe pumps.

The electrical installation comprises a starter and isolator switch, both these, and the power cable which follows the run of the delivery line, being flame-proof.

Another unusual condensate drainage installation by the South Eastern Gas Board deals with a large trunk main which passes under Woolwich Road, S.E.10. This 36-in. main is part of the supply to Sydenham, Worcester Park and Mitcham.

Special drainage is essential where the main passes under the L.C.C.'s southern outfall sewer near the junction of Woolwich Road and Halstow Road, before sloping upwards in the direction of Blackheath, and some 700 gal. of condensate must be dealt with weekly. The main and collector syphon at this point are some 30 ft. below ground, this run being necessary to pass under the sewer, and are completely filled in, so that a reliable pumping installation was needed.

Suction line

An M8 pump has again been used for the installation, located in a pit in Halstow Road in order to reduce suction level on the pump and to allow access to the pump, motor and delivery lines. The suction line, which is of 1¼-in. diameter galvanised heavy-weight piping, is duplicated and further protected against corrosion by enclosure in pitch within a 3-in. asbestos pipe. This pump is also manually controlled from a kiosk at ground level.

MIDLANDS CLAMOUR FOR GAS & COKE

THE WEST MIDLANDS GAS BOARD is working at full pressure to cope with demands for gas and coke this winter.

Gas sales over a recent ten-day period were the highest for four years. Three weeks ago output totalled 1,896 mill. cu.ft. Two weeks ago, although it was warmer, sales continued at the same peak.

The increase is due to the increased use of gas for home heating, said the Board. A large number of gas fires have been brought into use. The setting up of smokeless zones also increased the demand for gas.

Although more than 300,000 tons of coke are in store, customers are having to wait eight to ten days for delivery.

Everyone has waited until the bad weather, and all ordered at once. 'Our transport department is finding it very difficult to deal with the demand,' explained a Gas Board spokesman.

PERSONAL NOTES

MR. W. H. RITCHIE has been appointed Development Manager—Projects, and MR. N. G. H. THOMAS Development Manager—Products of Monsanto Chemicals Ltd., both appointments taking effect from January 1, 1960. Mr. Ritchie and Mr. Thomas will both be responsible to DR. J. A. GARDNER, Controller of Development. Mr. Ritchie, who joined Monsanto in 1937, will be responsible for progressing the manufacture of new products, and for development planning. Mr. Thomas, who joined Monsanto in 1946, will be responsible for the development and introductory marketing of new products, and for market research.

MISS R. AYLOTT, who has been in charge of the billing machine room at Westminster for the past 28 years of her 48 years of her service there, has retired from the service of the North Thames Gas Board, Central Division. Her family claim a total of 300 years' service with the Board and its predecessor.

MR. E. A. HOWE, Managing Director of Film Cooling Towers (1925) Ltd., will shortly be leaving for a four weeks' business tour of the Caribbean. He will be flying direct to Antigua and expects to visit cooling tower installations in St. Kitts, Barbados, Jamaica and Trinidad.

MR. H. P. BARKER, Chairman and Managing Director of Parkinson Cowan Ltd. has been elected Chairman Designate of the British Institute of Management. He will succeed Lord Verulam at the annual general meeting of BIM in October.

OBITUARY

MR. WILLIAM MATHIESON, a former managing director, until his retirement about 20 years ago, of Wilsons & Mathiesons Ltd., engineers, Leeds (of which his father was co-founder about 80 years ago) and a director of Radiation Ltd., of which group Wilsons & Mathiesons form part, has died aged 79.

RETIREMENT MARKED

MR. JOHN F. FOSTER, Manager of the Largs branch of the Scottish Gas Board, was the guest of honour at a recent dinner to mark his retirement after over 30 years' service. Among those present was Mr. H. R. Hart, General Manager of the Glasgow and Western Division of the Scottish Gas Board. Both Mr. and Mrs. Foster were the recipients of gifts from the staff.

Long service awards were also presented to Mr. Foster and Messrs. Thomas Savage, James McArthur, John Hendry and J. Gillespie Little, all of whom had over 25 years' service.

NEON WEATHER 'CAST DRAWS TRAVELLERS' ATTENTION TO GAS

AN estimated 60 mill. railway passengers a year, using the lines in and out of Waterloo, will see a revolutionary development in advertising as they pass the Nine Elms gasworks of the North Thames Gas Board.

An illuminated coloured electric wall newspaper, the first sign of its type to be erected in Britain and claimed to be the largest in the world, runs, alternately, weather forecasts and 'commercials' from gas and coke appliance manufacturers, in 6-ft. high letters across a strip, containing 12,600 electric bulbs, 114 ft. long. Surmounting the sign is a neon-lit Mr. Therm symbol and the words 'North Thames Gas' in neon illuminated letters. Immediately above the strip, the words 'Weather Forecast' flash on and off to coincide with the message.

The Board has an agreement with the Meteorological Office for the supply of two local weather forecasts per day, lasting five seconds on the sign. The commercials will last for approximately ten seconds.

The first of these signs was erected in the Place Brouckere, Brussels, but the one at Nine Elms is the most ambitious yet supplied. The first British siting was to have been on the proposed Monico site, in London's Piccadilly, but, as was made known recently, plans for this development have been deferred.

Mr. Leslie Hardern, Public Relations Officer to the Board, told a visiting Press party recently that the preliminaries to the erection of the sign had taken two years. Because of the accuracy needed in perforating tapes containing the messages, a Belgian firm had undertaken the job and was flying completed tapes to the United Kingdom.

Three colours are used on the sign, red, green and white. These colours have been agreed with the Southern Region of British Railways, who originally feared that such a combination might lead to confusion with railway signalling for their train crews.

Any kind of lettering and colour combination can be used, as can diagrams, cartoon figures and trade marks.

Manufacturers now using this media include Cannon, Newhome, Stoves, Electrolux (refrigerators), Wilkins & Mitchell (Service washing machine), Sidney Flavel, R. & A. Main, Parkinson Cowan, Radiation (cookers), Ascot (water heaters), and Morphy-Richards (Astral refrigerator).

General Gas Appliances Ltd., have agreed to take space on the sign shortly.

China orders British

China has placed another order, to the value of £8,000, for six gas-liquid chromatographic analysis apparatus manufactured by Griffin & George, Ltd. This is the second large order to be received from China in 12 months, making the number of these instruments now in use in China nine.

COMING EVENTS

February 17.—THE INSTITUTE OF WELDING, NORTH LONDON BRANCH: 54, Princes Gate, Exhibition Road, South Kensington, S.W.7. 'High Pressure Pipe-lines in the Gas Industry,' by F. W. Bell. 7.30 p.m.

February 18.—COMBUSTION ENGINEERING ASSOCIATION, NORTHERN REGION: George Hotel, Huddersfield. 'The Workings of the Clean Air Act.' 2.30 p.m.

February 19.—LONDON AND SOUTHERN JUNIORS: Westminster Technical College, Vincent Square, London, S.W.1. 'The Design and Performance of Convector Fires,' by E. W. Berry and J. Taylor. 6.30 p.m.

February 20.—WESTERN JUNIORS: Visit to Severn Tunnel pumping station at Sudbrook.

February 23.—COMBUSTION ENGINEERING ASSOCIATION, NORTH WESTERN REGION: The Engineers' Club, Albert Square, Manchester. 'Refractories for Kilns and Furnaces,' by N. W. Hinchliffe. 2.30 p.m.

February 24.—MANCHESTER JUNIORS: Visit to the refinery of Petrochemicals Ltd., at Carrington. Paper by L. G. Townsend on 'Some Thoughts on Water Treatment.'

February 25.—LONDON AND SOUTHERN JUNIORS: Visit to the Royal Mint.

February 25.—NORTH THAMES G.C.C.: Meter Works, Pound Lane, Willesden, N.W.10. Council Meeting.

CLOSED—AFTER 108 YEARS

FILEY gasworks are to close down, except for storage, later this year, when gas will be obtained from the Scarborough gasworks.

It was 108 years ago that Filey first started to produce gas, when a Scarborough company built the gasworks, the Filey Urban District Council taking them over about 30 years later and running them until nationalisation in 1949.

Mr. J. W. Parker, Engineer and Manager at Filey, says the present gas-producing plant has been in constant use for 30 years. It is manually-operated and nine stokers will be affected by the close-down.

House-heating show

A new exhibition of domestic heating apparatus and fuels is to be held in London, August 19-25, at the Royal Horticultural Society's new hall.